Please rewrite the paragraph beginning on page 25, line 14 as follows:

It turns out in force reflecting applications that the maximum application of force required often is not necessary for prolonged periods. To a certain degree, such peak performance is only required when first touching the representation of an object, at which point it is common practice to "back off" from it anyway. To improve performance yet manage power, the system may take advantage of the fact that most motors have two ratings. One is a nominal consumption-type rating associated with average current during operation. This rating is also a direct function of the degree of heat dissipated by the motor in a steady-state sense; that is, how much heat the motor windings can endure before they start melting. Most motors also have a peak rating, however, which is much higher, often twice as high as the nominal. This value is related to how much power the unit can handle in an instantaneous sense, despite the amount of heat generated.

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*In the Claims*

Please add new claims 46-72 as follows:

sub. F1

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46. (New) A system comprising:

a manipulandum;

a force-feedback actuator coupled to said manipulandum;

a position sensor coupled to said manipulandum;

a memory comprising a stored force feedback effect; and

a computer-mediated controller coupled to said force-feedback actuator, said position sensor, and said memory, wherein said computer-mediated controller is operable to:

receive input information through a communication port of said computer-mediated controller and decodes commands from said input information,

read force values from said communication port,

output output data on said communication port, said output data including position data from said position sensor,

determine a calculated force feedback effect to contribute to output of said force feedback system,

process said stored force feedback effect to determine a force contribution from said stored force feedback effect, and

Sub. A71

output a force feedback value based on said determined force contribution to said force feedback actuator.

47. (New) A system as recited in claim 46, wherein said force feedback effect comprises an effect selected from the group consisting of a detent effect, a wall effect, and a spring effect.

48. (New) A system as recited in claim 46, wherein said force feedback effect comprises an attribute selected from the group consisting of a stiffness attribute, a damping attribute, a force attribute, and a distance attribute.

E14 Sub. A72

49. (New) A system as recited in claim 46, wherein said memory comprises a plurality of stored force feedback effects and said force feedback value comprises the sum of force contributions from said plurality of stored force feedback effects.

50. (New) A system as recited in claim 46, wherein a plurality of pointers determine the force feedback effect to contribute to said output force feedback value.

51. (New) A system as recited in claim 46, wherein said computer-mediated controller:
computes a manipulandum velocity from said position data; and
incorporates said velocity in said determination of said force contribution.

52. (New) A system as recited in claim 46, further comprising a stored representation of a boundary, wherein said determination of said force contribution utilizes said stored representation of said boundary and said position data.

Sub. A73

53. (New) A system as recited in claim 52, further comprising a button coupled to said manipulandum and said computer-mediated controller.

54. (New) A device comprising:
a manipulandum having at least one degree of freedom of ;
an actuator coupled to said manipulandum;

a position sensor for determining a position of said manipulandum in said at least one degree of freedom; and

wb. 13

a computer-mediated controller coupled to said actuator and to said position sensor, wherein said controller is operable to:

receive input information through a communication port of said computer-mediated controller and decodes commands from said input information,

read force values from said communication port,

output output data on said communication port, said output data including position data from said position sensor,

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determine at least one installed force feedback effect to contribute to output of said force feedback system,

process said installed force feedback effect to determine a force contribution from said installed force feedback effect, and

output a force feedback value based on said determined force contribution to cause a force based on said force feedback value to be output by said actuator to the user of said force feedback system.

55. (New) A device as recited in claim 54, wherein said manipulandum comprises a joystick.

56. (New) A device as recited in claim 54, further comprising a deadman switch for disabling said output forces.

wb. F4

~~57. (New) A device as recited in claim 54, further comprising a gear transmission provided between said manipulandum and said actuator, said gear transmission transmitting said output forces from said actuator to said manipulandum.~~

58. (New) A device as recited in claim 54, further comprising a memory coupled to said computer-mediated controller.

59. (New) A device as recited in claim 58, wherein said memory comprises non-volatile memory.

60. (New) A device as recited in claim 54, wherein said force feedback effect comprises at least one of a detent, a wall, and a spring.

Amb. F5

61. (New) A device as recited in claim 54, wherein said force feedback effect comprises an attribute, wherein said attribute comprises an attribute selected from group consisting of a stiffness attribute, a damping attribute, a force attribute, and a distance attribute.

62. (New) A method for providing haptic feedback, comprising:

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outputting a maximum peak force from an actuator to a manipulandum of a force feedback device, wherein said manipulandum comprises at least one degree of freedom, and wherein said maximum peak force is related to a maximum power that said actuator can utilize instantaneously; and

reducing said output of said maximum peak force to an output of a nominal peak force from said actuator when said power utilized by said actuator exceeds an average power level over a predetermined period of time, wherein said nominal peak force is related to a maximum power that said actuator can utilize in continuous steady-state operation.

63. (New) A method as recited in claim 62, wherein said maximum peak force is output only during an initial movement of said manipulandum corresponding to entry into an object simulated by a computer system.

Amb. F6

64. (New) A method as recited in claim 62, wherein said maximum peak force has about twice as great a magnitude as said nominal peak force.

65. (New) A method as recited in claim 62, wherein said nominal peak force is associated with an average current during operation of said actuator.

66. (New) A method as recited in claim 62, further comprising monitoring average power requirements of said actuator over time to determine when said power utilized by said actuator exceeds said average power level over said predetermined period of time.

67. (New) A method as recited in claim 62, wherein said predetermined period of time comprises about two seconds.

68. (New) A device comprising:

a manipulandum moveable in at least one degree of freedom;

a position sensor coupled to said manipulandum, said position sensor operable to detect a position of said manipulandum at least one degree of freedom; and

an actuator coupled to said manipulandum, said actuator operable to output a maximum peak force on said manipulandum,

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wherein said maximum peak force is related to a maximum power that said actuator can utilize instantaneously, and wherein said maximum peak force is reduced to a nominal peak force by said actuator when the power utilized by the actuator exceeds an average power level over a predetermined period of time, and wherein a nominal peak force is related to a maximum power that said actuator can utilize in continuous steady-state operation.

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69. (New) A device as recited in claim 68, wherein said maximum peak force is output only when the user initially moves the manipulandum into an object simulated in the computer graphical simulation.

70. (New) A device as recited in claim 68, wherein said maximum peak force has about twice as great a magnitude as said nominal peak force.

71. (New) A device as recited in claim 68, wherein said predetermined period of time comprises about two seconds.

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72. (New) A device as recited in claim 68, wherein said manipulandum comprise a joystick.